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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/632,284	08/01/2003	James M. Tour	11321-P022WUD3	5081
<div>7590      01/17/2007 Ross Spencer Garsson Winstead Sechrest &amp; Minick P.C. P.O. Box 50784 1201 Main Street Dallas, TX 75250-0784</div>			<div>EXAMINER SELLERS, ROBERT E</div>	
			<div>ART UNIT 1712</div>	<div>PAPER NUMBER</div>
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		01/17/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/632,284

Applicant(s)

TOUR ET AL.

Examiner

Robert Sellers

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 97-109, 134 and 135 is/are pending in the application.
- 4a) Of the above claim(s) 99 and 101-103 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 97, 98, 100, 105-109, 134 and 135 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2 March 2004</u> .  | 6) <input type="checkbox"/> Other: _____                          |

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1. To complete the response to the restriction and election of species requirement mailed August 21, 2006, the species of diazonium derivatizer of carboxybenzenediazonium tetrafluoroborate identified by structure 12 in Figure 1 has been elected by Sarah. S. Bittner in a telephone conversation conducted January 8, 2007. Claims 99 and 101-103 have been withdrawn without traverse as being directed to non-elected species.

2. The claims are accorded the effective filing date of January 29, 2002 from PCT application no. PCT/US02/02562 under 37 CFR 1.371 since provisional application application nos. 60/254,784; 60/272,903 and 60/316,521 are directed to diazonium-derivatized carbon nanotubes without a description of the instantly claimed dispersing in a polymer. Provisional application no. 60/316,501 is drawn to a polymer composite containing phenol-, thiophenol- or aniline-derivatized carbon nanotubes as opposed to the instantly claimed diazonium derivatizer.

3. The specification on page 1 according to the preliminary amendment filed August 1, 2003 does not indicate the status of parent application no. 10/470,517 as pending.

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4. The claims of related application no. 10/561,712 set forth the diazonium-functionalization (claim 4) of carbon nanotubes, mixing them with an elastomeric precursor, and curing the mixture. The further curing step is a materially different manipulation of the uncured dispersion of the instantly claimed method.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 135 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. The species of polyethylene, epoxy resin, polypropylene and polycarbonate are not elastomers. Polyethylene and polypropylene are thermoplastics. An epoxy resin is a thermoset. The specification on page 18, lines 28-34 designate these species as polymers of the matrix. More favorable consideration would be given to the designation of the species as polymers directly dependent on independent claim 97 for proper antecedent basis.

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The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Omum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 97, 98, 100, 104-109, 134 and 135 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 97-109 of copending application no. 10/632,419 in view of the Journal of the American Chemical Society by Bahr et al. entitled "Functionalization of Carbon Nanotubes by Electrochemical Reduction of Aryl Diazonium Salts: A Bucky Paper Electrode." (Claim 97-109 have been cancelled in U.S. Publication No. 2005/0207963 corresponding to the copending application.)

6. Although the conflicting claims are not identical, they are not patentably distinct from each other. The claims of the copending application denote the derivatizing of carbon nanotubes and dispersing them in a polymer which can contain a curing agent (claims 105-109). The claimed derivatizing with a diazonium specie is not recited.

7. Bahr et al. teaches the functionalization of carbon nanotubes with aryl diazonium salts including species depicted in Figure 1 (page 6537, first column, Figure 2) rendering them amenable to composite formation (page 6536, first column, Introduction, lines 2-4). The functionalizing moieties can be removed by heating in an argon atmosphere (page 6536, Abstract, line 5 and page 6541, second column Conclusions, lines 11-12).

8. It would have been obvious to derivatize the carbon nanotubes of the copending application with a particular type of functional group such as the diazonium species of Bahr et al. in order to facilitate their incorporation into polymer composite materials (page 6541, second column, lines 13-15).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 97, 98, 100, 104-109, 134 and 135 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3, 6 and 15 of provisional application no. 60/598,090 in view of Bahr et al. (No U.S. application of the provisional application has been filed as of the date of this non-Final rejection.)

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9. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the provisional application define a method of dispersing functionalized (claims 2 and 3) carbon nanotubes in a polymer matrix using a compatibilizing surfactant. The claimed method does not preclude the compatibilizing surfactant. The claimed derivatizing with a diazonium specie is not recited.

10. Bahr et al. is described in previous paragraph 4. It would have been obvious to derivatize the carbon nanotubes of the provisional application with a particular type of functional group such as the diazonium species of Bahr et al. in order to facilitate their incorporation into polymer composite materials (page 6541, second column, lines 13-15).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 97, 98 and 100 are rejected under 35 U.S.C. 102(a) as being anticipated by Bahr et al.

11. Bahr et al. is discussed in paragraph 4 hereinabove and espouse the incorporation of diazonium-derivatized carbon nanotubes into polymer composite materials.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 97, 98, 100, 104-109, 134 and 135 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bahr et al. and Smalley et al. Patent No. 7,105,596.

12. Bahr et al. is described in paragraph 4 hereinabove. The claimed curing agent and particular species of polymer of claims 104-109, 134 and 135 are not recited.

Smalley et al. reports the derivatization of single-walled carbon nanotubes "using known reaction schemes for the reactive sites (col. 19, lines 18-25) and their use in composite materials such as epoxies (col. 38, lines 20-27 and 58-59) combined with a hardener (col. 50, Example 10, lines 22-27).

13. It would have been obvious to employ the diazonium-derivatized carbon nanotubes of Bahr et al. in a particular kind of composite such as the epoxy-hardener composite shown in Smalley et al. in order to improve the delamination resistance (Smalley et al., col. 50, lines 33-36).

14. Smalley et al. does not recite the claimed diazonium derivatizer. It would have been obvious to derivatize the carbon nanotubes of Smalley et al. with a certain type of derivatizer such as the diazonium species of Bahr et al. in order to facilitate their incorporation into polymer composite materials (Bahr et al., page 6541, second column, lines 13-15).



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15. The prior art made of record and not relied upon is considered pertinent to the disclosure. The remainder of the references are directed to polymer matrices embedded with various non-diazonium functionalized carbon nanotubes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert Sellers whose telephone number is (571) 272-1093. The examiner can normally be reached on Monday to Friday from 9:30 to 6:00. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).



Robert Sellers  
Primary Examiner  
Art Unit 1712

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1/10/2007